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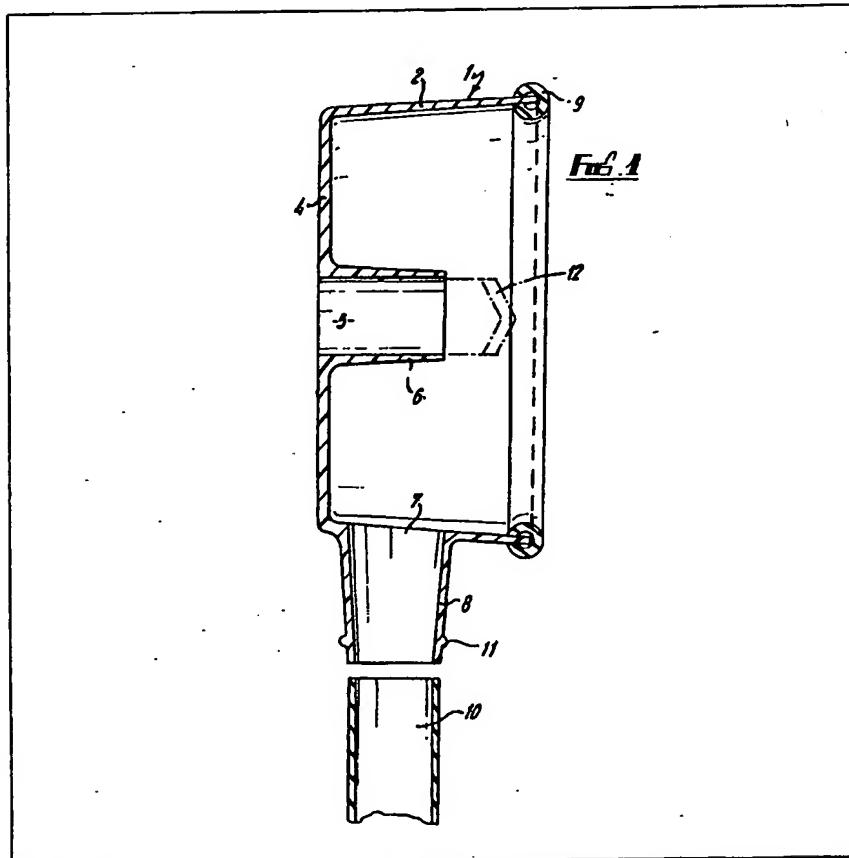
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(54) Dust removal during drilling

(57) Dust and debris is removed by a chamber (1) around a drill at the drilled surface during the drilling operation.

The chamber (1) is a one-piece plastics moulding having an open end (3) for application to the surface, an opposite closed end (4) with a central aperture (5) through which the drill can be inserted, and a side outlet nozzle (8) which can be connected to a suction unit e.g. a vacuum cleaner via a flexible hose (10). The aperture is provided by a sleeve (6) surrounding the drill and optionally the drill chuck. Sleeve liners may be used for different drills. The chamber may be transparent with alignment markings for drilling.



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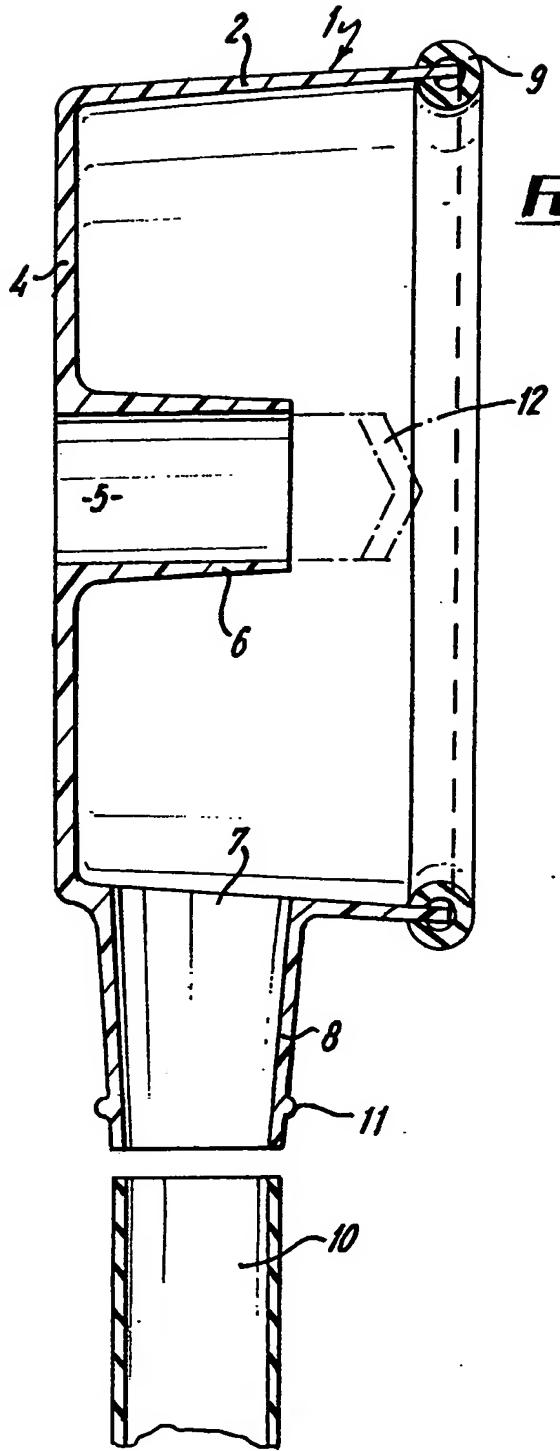


FIG. 1

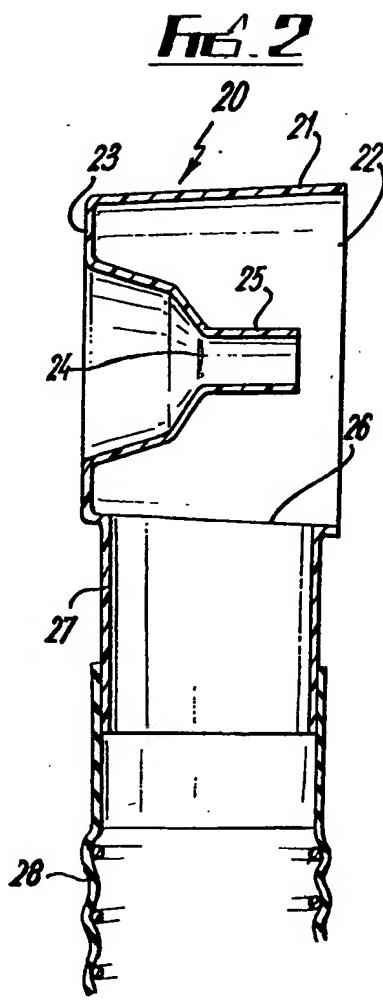


FIG. 2

SPECIFICATION

Dust removal

5 This invention relates to the removal of dust and debris produced during drilling.

Dust and debris generated during drilling, particularly when drilling brick or stone surfaces, can cause considerable inconvenience 10 and may give rise to problems due to contamination of nearby surfaces and also of the working environment of the person performing the drilling operation.

An object of the present invention is to 15 eliminate or at least appreciably reduce such inconvenience and problems.

According to one aspect of the present invention therefore there is provided a method of removing dust and debris during drilling of 20 a surface with a drill wherein a chamber is disposed around the drill at or close to the said surface so as to contain therein dust and debris produced by the drilling operation. The invention also provides a dust removal device 25 comprising a chamber which is open at one end for application to a surface to be drilled and at its opposite end has a wall with an aperture therein to permit passage therethrough of a drill, said chamber also having 30 an outlet connection thereto to permit egress of dust and debris produced within the chamber during drilling of the said surface.

With the method and device of the invention it will be appreciated that it is possible to 35 prevent or at least reduce escape of drill dust and debris to the surrounding environment during drilling of a surface.

The dust and debris contained within the chamber may be discharged therefrom in any 40 suitable manner although most preferably suction is applied to the chamber so that the dust and debris can be continuously drawn from the chamber during drilling. Such suction may also be utilised to hold the chamber in position on the surface to be drilled.

Most conveniently, and especially in the case where suction is utilised as aforesaid, the chamber may be adapted to be sealed relative to the said surface, for example by provision 50 of a resilient sealing element around the periphery of the above-mentioned open end. Also, the above-mentioned aperture for the drill may be provided with a close-fitting sleeve around same which can be supported 55 on the drill shank and acts to prevent or reduce escape of dust and debris through the aperture.

The dust removal device of the invention 60 may be adapted to be mounted permanently or detachably on a drill or alternatively it may be in the form of a handheld device which in use is not attached to the drill.

The invention will now be described further 65 by way of example only and with reference to the accompanying drawings in which:—

Figure 1 is a diagrammatic sectional view of one form of a dust removal device according to the invention;

Figure 2 is a similar view of an alternative 70 form of device.

The dust removal device shown in Fig. 1 is particularly suitable for use with a hand-held drill used in the drilling of house bricks or stone to provide bores for insertion of cavity 75 wall insulation materials.

The device comprises a one-piece plastics moulding providing a chamber 1 having a frusto-conical side wall 2 which is open at its larger diameter end 3 and closed with an end 80 wall 4 at the opposite smaller diameter end. The end wall 4 has a central circular aperture 5, and an integral cylindrical sleeve 6 extends coaxially around the aperture 5 on the inner side of the end wall 4. The side wall 2 also 85 has an aperture 7 therein and this connects with an integral nozzle 8 on the outer side of the side wall 2. Around the periphery of the open end 3 of the side wall 2 a longitudinally split soft rubber tube 9 is pushed onto the 90 edge of the wall 2.

By way of example, the device may have the following dimensions:

thickness of side wall (2) = 2mm
outside axial length of the chamber (1) = 6cm
95 outside axial length of the sleeve (6) = 3.5cm
outside diameter of the open end of the chamber (1) = 12.5cm
internal diameter of the aperture (5) and of the sleeve (6) = 23mm.

100 In use the open end 3 of the chamber 1 is pressed by hand against the surface to be drilled, the rubber tube 9 acting as a sealing element to ensure substantially air-tight engagement with the surface. The nozzle 8 is connected via a flexible hose 10 to an air or electric suction unit (not shown), such nozzle 8 being appropriately tapered and having an external ridge 11 thereon to facilitate secure 105 attachment of the hose 10; and the drill bit 110 12 is inserted through the aperture 5 and sleeve 6 into engagement with the surface to be drilled. The above-mentioned dimensions are suitable for use with a 22mm diameter 115 drill bit, and, with such bit, the sleeve 6 fits closely around and is supported on the shank thereof. In use, an adequate working clearance can be maintained between the drill shank and the sleeve 6 although contact 120 therebetween does not necessarily give rise to any problems with a masonry drill bit of the kind which has cutting edges at its tip only.

The suction applied to the chamber 1 holds same securely against the surface to be 125 drilled, and, as drilling proceeds, dust and debris is contained by the chamber 1 and is drawn therefrom through the nozzle 8 into the suction unit, such unit being provided as appropriate with a filter and collection chamber 130 to enable the dust and debris to be

collected for disposal. Appreciable contamination of the surrounding environment can therefore be effectively prevented in a particularly simple and convenient manner.

5 Before commencement of drilling, the chamber can be moved away from surface along the drill shank thereby to permit easy centring of the drill bit with the desired drilling position. During drilling, slight deflections
 10 of the drill bit can be readily accommodated due to the flexibility of the sleeve 6 and adjoining parts of the chamber.

The device of Fig. 2 is particularly suitable for use with a hand-held drill used in the
 15 drilling of an internal wall surface of a domestic residence.

The device is similar to the device of Fig. 1 in that it comprises a one-piece plastics moulding providing a chamber 20 with a
 20 frusto-conical side wall 21, an open larger end 22, an opposite end wall 23, a central aperture 24 with an integral sleeve 25, and a side aperture 26 with a nozzle 27. However, the chamber 20 is of small dimensions suited to
 25 the use thereof in locations of limited space or access. If desired, the sleeve 25 and end walls 23 may be arranged as shown to accommodate the chuck as well as the bit of a conventional electric hand drill. The rim of the
 30 open end 22 may be flanged or provided with a resilient seal to facilitate close contact with the wall surface being drilled. The nozzle 27 may be connected in use to a domestic vacuum cleaner via the usual expandible hose 28
 35 used to connect cleaning tools thereto.

During use, the device can be held in position using the nozzle 27 or the hose 28 as a hand grip.

In order to facilitate alignment of the drill
 40 with the desired drilling location, the device may be formed from a transparent plastics material. Alternatively or additionally, the outer surface of the wall 21 may have markings or configurations thereon at 90° intervals
 45 for alignment with a cross marked on the wall surface and centred on the desired drilling location.

It is of course to be understood that the invention is not intended to be restricted to
 50 the details of the above embodiments which are described by way of example only. Thus, for example, the chamber 1 need not be of circular cross-section as described above but instead may be of square cross-section or of
 55 any other suitable form. Also it will be appreciated that the shape and dimensions of the device can be varied in accordance with the dimensions of the drill bit used and to suit other requirements. If desired, the device may
 60 have an adjustable structure and/or may have a range of attachments therefor, whereby the same device can be readily modified for use with a range of drill bits and/or for a range of applications. Most conveniently, the inner di-
 65 ameter of the sleeve 6, 25 may be selected to

accommodate the largest size drill bit to be used therewith and sleeve linings may be used to reduce such diameter for smaller bits.

The device of the invention may be used in
 70 the context of drilling large bores in brick or stone walls or in a domestic context for drilling small holes in walls, or woodwork, or in an industrial context for drilling holes in hazardous materials such as asbestos, or for any
 75 other suitable purpose.

CLAIMS

1. A method of removing dust and debris during drilling of a surface with a drill wherein
 80 a chamber is disposed around the drill at or close to the said surface so as to contain therein dust and debris produced by the drilling operation.
2. A method according to claim 1,
 85 wherein suction is applied to the chamber to draw dust and debris therefrom continuously during drilling.
3. A method according to claim 1 or 2 when used during drilling of house bricks or
 90 stone to provide bores for insertion of cavity wall insulation materials.
4. A method according to claim 1 or 2, when used during drilling of an internal wall surface of a domestic residence.
- 95 5. A dust removal device for use in performing the method of claim 1, comprising a chamber which is open at one end for application to a surface to be drilled and at its opposite end has a wall with an aperture
 100 therein to permit passage therethrough of a drill, said chamber also having an outlet connection thereto to permit egress of dust and debris produced within the chamber during drilling of the said surface.
- 105 6. A device according to claim 5, wherein a resilient sealing element is provided around the periphery of said open end.
7. A device according to claim 5 or 6, wherein the said aperture for the drill is provided with a sleeve around same.
- 110 8. A device according to claim 7, wherein said sleeve is within the chamber.
9. A device according to any one of claims 5 to 8, wherein the said outlet connection is provided at a side wall of the chamber.
- 115 10. A device according to any one of claims 5 to 9, wherein said chamber is a one-piece plastics moulding.
11. A device according to any one of
 120 claims 5 to 10, wherein said chamber is formed from a transparent material.
12. A device according to any one of claims 5 to 11, wherein alignment markings or configurations are provided on the periphery of the chamber for alignment with markings on the surface to be drilled.
13. A device according to any one of claims 5 to 12, wherein the said outlet connection is connected to a suction unit via a
 130 flexible hose.

14. A device according to claim 13,
wherein the suction unit is provided by a
vacuum cleaner.

15. A method and a device substantially
5 as hereinbefore described with reference to
and as illustrated in the accompanying draw-
ings.

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